REMARKS

Claim 106 has been amended and claims 118-119 have canceled. Thus, claims 88-96, 98-99, 101, 103-107, 108-117, and 120 are presently pending, of which claims 88-96, 98-99, 101, 103-105, and 108-115 have been withdrawn from consideration and claims 106-107 and 116, 117, and 120 are currently being examined. No new matter has been added, because, as explained below, support for each new or amended claim comes directly from previously filed claims. Entry of the amendments at this time is therefore respectfully requested.

Claim Rejections 35 U.S.C. § 102

The Office Action rejected claims 106-107, 116, 118 and 120 as being anticipated under §102 by U.S. Patent No. 5,013,569 to Rubin (hereinafter "Rubin"). The Office Action did not, however, reject claim 119 under §102. Claim 119 includes a further limitation (wherein the heat sensitive bioactive ingredient is "insulin"). As the Office Action acknowledges, Rubin does not disclose, claim – or indeed, even mention – encapsulated insulin. Independent claim 106 has therefore been amended to include the limitations of claim 119 in order to overcome the §102 rejection. Claims 118-119 have been canceled. Claims 107, 116, 117 and 120 all depend directly from claim 106 and are therefore also novel.

The standard for lack of novelty under §102 is one of strict identity. "Every element of the claimed invention must be identically shown in a single reference." *In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990), *quoting Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 677 (Fed. Cir. 1988). *See also* MPEP § 2131 ("the identical invention must be shown in as complete detail as is contained in the . . . claim."), *quoting Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989).

As explained above, Rubin lacks a critical element of amended claim 106 (encapsulated insulin) and therefore cannot anticipate the claim under §102. As amended, claim 106 includes the limitations of (now canceled) claim 119. The Office Action previously acknowledged the novelty of claim 119. *See* Office Action at 4 ("Rubin does not teach feed substitute as milk replacer *or bioactive ingredient as insulin*"). (Emphasis added). For the foregoing reasons, Applicant respectfully requests that the Examiner withdraw the rejection of claim 106. Claims

107, 116, 117 and 120 all depend directly from claim 106 and include further limitations. These claims are therefore also novel under § 102 and Applicant also respectfully requests removal of the rejections on this ground.

Claim Rejections 35 U.S.C. § 103

The Examiner rejects claims 117 and 119[1] as being unpatentable over Rubin in view of U.S. Patent No. 5,531,989 to Paul (hereinafter "Paul"). The Examiner states that it would be obvious to one of ordinary skill to incorporate the bioactive ingredient such as insulin in the microencapsulating process taught by Rubin because Paul teaches incorporation of bioactive compounds in feed which are helpful in gastrointestinal benefits.

Applicant respectfully traverses. According to the teachings of Paul, the bioactive compounds for restoring and maintaining gastrointestinal benefits are immunoglobulins and dietary fibers. Nowhere in Paul are those ingredients referred to as sensitive ingredients that should be encapsulated or otherwise protected when prepared as a feed formula. This is in complete contrast to the teachings of the present invention, which provides methods enabling the preparation of feed formulations for oral delivery of heat sensitive ingredients, specifically insulin.

A. Paul fails to disclose, teach, or suggest the very limitations for which it was cited, and specifically teaches away from encapsulating bioactive insulin.

The Office Action concedes that "Rubin does not teach feed substitute as milk replacer or bioactive ingredient as insulin", and then relies on Paul to provide these missing elements. (Office Action at 4.) Yet Paul lacks both of these elements. Paul discloses and claims an immunoglobulin and fiber containing composition. *See* Abstract. Although some elements of the composition (the "immunogolubulin composition") are "purified from bovine milk, milk products, or whey", the overall composition itself is not commensurate with the "milk replacer" or "milk substitute" of claim 117. *Id.* In fact, the "immunoglobulin composition" is only "40-60%" of the entire composition in Paul. *See* Cols. 3-4. The other 40-60% of the composition of

1 The limitations of former claim 119 (*e.g.* wherein the heat sensitive bioactive ingredient is "insulin") have been incorporated into independent claim 106, as amended.

Paul is comprised of "soluble dietary fiber." *Id.* The overall composition does not result in a "milk replacer" of claim 117, nor is it intended to serve as one. Rather, it is simply "a composition for improving and maintaining gastrointestinal health . . . that provides the typical advantages of dietary fiber and additionally is low in calories." Col. 3:16-22. This composition clearly lacks the characteristics necessary to serve as a "milk replacer" or "milk substitute".

Moreover, Paul, like Rubin, fails to disclose, teach, or suggest encapsulation of the "bioactive ingredient as insulin." (Office Action at 4.) Paul does teach incorporation of "*inulin*" (not *"insulin"*) into the composition, and on this basis the Office Action concludes that "[i]t would be obvious to one of ordinary skill to incorporate the bioactive ingredient such as insulin in the microencapsulating process taught by Rubin because Paul teaches incorporation of bioactive ingredients in feed which are helpful in gastrointestinal benefits." *Id.* at 5 (Emphasis added.) Inulin, however, differs markedly from *insulin*. Inulin is simply a "soluble dietary fiber" (col. 4:51-55) which, when incorporated into the composition of Paul, "*does not affect blood glucose or insulin levels*" (col. 3:22-23). In contrast, insulin is *not* a soluble dietary fiber and is in fact a primary arbiter of blood glucose levels.

Paul requires that the resulting composition (including any bioactive ingredient) "not affect blood glucose or insulin levels." *Id.* This teaches away from present invention. Indeed, one cannot argue otherwise, because the incorporation of insulin necessarily affects blood glucose *and insulin levels*. It is a fundamental principle that "a prior art reference that 'teaches away' from the claimed invention is a significant factor to be considered in determining obviousness." *See* MPEP 2145 X(D)(1). Moreover, references that teach away cannot be used to support of a *prima facie* case of obviousness. *See McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1354 (Fed. Cir. 2001).

Encapsulating bioactive insulin in a nutritional food or feed formula represents the heart of the present invention, and Applicant has amended claim 106 (the only pending independent claim) to emphasize this novel and nonobvious limitation. The Examiner, in turn. bears the burden of establishing a *prima facie* case of obviousness. *See In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998). In support of its obviousness rejection, however, the Office Action relies on a reference (Paul) that teaches away from the present invention. Yet references that teach away

from the present invention or proposed combination cannot be used in support of a *prima facie* case of obviousness. *See McGinley*, 262 F.3d at 1354; *see also* MPEP § 2145, *quoting In re Grasselli*, 713 F.2d 731, 743 (Fed. Cir. 1983) ("It is improper to combine references where the references teach away from their combination"). As explained above, Paul expressly teaches away from the present invention and therefore cannot be used to support a prima facie case of obviousness.

With or without Paul, the obviousness rejection of claims 117 and 119 fails. Paul is the only reference cited by the Office Action to provide the crucial missing limitation (encapsulated bioactive insulin). Yet Paul does not disclose, teach, or suggest incorporation of encapsulated bioactive insulin. Instead, Paul explicitly teaches away from incorporating bioactive insulin. *See* col.3:22-23 (explaining that the composition "*does not affect blood glucose or insulin levels*") (emphasis added).

1. The Office Action merely relies on conclusory assertions of obviousness. This cannot support a *prima facie* case of obviousness.

As the Supreme Court explained, "rejections based on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1741 (2007). To support its obviousness rejection, however, the Office Action relies on just such a conclusory assertion: "[i]t would be obvious to one of ordinary skill to incorporate the bioactive ingredient such as insulin in the microencapsulating process taught by Rubin because Paul teaches incorporation of bioactive compounds in feed which are helpful in gastrointestinal benefits." (Office Action at 5). At best, this is a *non-sequitur*, because the conclusion does not logically follow from its premises. Moreover, this is precisely the type of conclusory assertion that – according to the Supreme Court – cannot support an obviousness rejection. The statement lacks any rational underpinning, and in fact contradicts the explicit teachings of Paul. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the § 103 rejection of claim 106 (including the limitations of former claim 119) and all claims dependent thereon (*e.g.* claims 107, 116-17, and 120).

B. Dr. Lora Eshkar Sebban's 37 C.F.R. § 1.132 Declaration Further Supports the Nonobviousness of the Present Invention.

To support the non-obviousness of the method for improving health of a newborn and the patentability of the present invention, Applicant submits herewith a Rule 132 Declaration from Dr. Lora Eshkar Sebban. Dr. Sebban is one skilled in the art of the present invention. *See* Declaration at ¶ ¶ 2-3. It is well-established that Examiners should consider declarations from those skilled in the art praising the claimed invention and opining that the prior art teaches away from the invention. *See In re Beattie*, 974 F.2d 1309, 1313 (Fed. Cir. 1992). Moreover, evidence of secondary considerations such as "long felt but unsolved needs, [and] failure of others" support a finding of nonobviousness. *See Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966).

Dr. Eshkar Sebban declares that the methods of the invention answer a long-felt but unsolved need for formulations of proteins for oral delivery. *See* Declaration at ¶ ¶ 4-9. Dr. Eshkar Sebban further declares that the encapsulated heat-sensitive bioactive ingredients, particularly insulin, must retain their activity not only through the encapsulation process but also through the production of the feed formulation. *Id.* In order to improve the health status of a mammal, moreover, these heat-sensitive ingredients (including insulin) must also maintain their biological activity after consumption. *Id.* Yet production processes for feed formulations typically comprise harsh exogenous conditions, including heating. *Id.* at ¶ 8. The present invention shows for the first time that the claimed encapsulation process protects insulin within the feed formula and through the gastrointestinal system. *Id.* at ¶ ¶ 5-9.

The method of the present invention for improving the health status of a mammal comprises administration of an edible food or feed formulation containing bioactive encapsulated insulin. The claim is therefore limited to oral administration and has been amended accordingly. This amendment addresses the Office Action's contention that "there is no recitation of oral administration recited in the claims." (Office Action at 9). Moreover, claim 106 has been amended to specifically recite that "the improvement in health", as supported by the instant specification, includes "at least one of increasing the rate of weight gain of said mammals, preventing diarrhea and other gastric disorders and increasing the life expectancy of said

mammals after birth." This addresses the Office Action's contention that "it is not clear . . . in what sense the improvement in health was seen." (Office Action at 9). As a result, Applicant's previous arguments regarding the surprising and unexpected ability of the claimed method to maintain the bioactivity of insulin and improve the health status of a mammal are now commensurate with the scope of the claims and therefore support the nonobviousness of claim 106 (and all claims dependent thereon). *See* MPEP § 716.02 - § 716.02(g) (evidence demonstrating unexpectedly advantageous or surprising results rebut a *prima facie* finding of obviousness).

1. The claimed "improve[ments] in the health status of a mammal" are dependent upon the encapsulation process recited in the claims. The process is therefore entitled to patentable weight.

Rubin discloses an infant food formulation in which fatty acids (DHA and EPA) and immunoglobulins are encapsulated in microcapsules having a diameter of less than 350μ. However, Rubin makes clear that "…the specific microencapsulating method and coating are not peculiar to the present invention." (Emphasis added). Moreover, Rubin does not disclose any working example showing that the active ingredients are indeed stable within the formula, nor does it disclose whether the formula actually exerts the claimed activity upon consumption by an infant. Thus, it is impossible to draw from the teachings of Rubin which encapsulating technique may be used with a reasonable expectation of success.

In contrast, the present invention provides: (a) a method for improving the health status of a mammal comprising administering insulin encapsulated by a specific method (claim 106 steps (i)-(v)) and (b) data showing that providing the feed formula enriched with encapsulated insulin according to the teachings of the present invention indeed improved the health status of bovine and caprine neonates (*See* Examples 1 and 2 of the instant specification). The Office Action incorrectly claims that "the process of preparing in claims do not hold any patentable weight since the claims are drawn to [sic] method of improving health of infant by administering an encapsulated product", and that the "[b]urden is on applicant to show how the process changes the characteristics of the encapsulated product" (Office Action at 4.)

As Dr. Sebban explains, however, the improvement in health is dependent upon substantially maintaining the activity of insulin, which, in turn, is dependent upon the encapsulation process of claim 106. *See* Declaration at ¶ ¶ 5; 7-9. Without an encapsulation process that effectively preserves the bioavailability of insulin, the claimed improvements in health will not result. Thus, "the preparation of the feed or food formulation should not involve any steps that may cause significant insulin degradation or loss of activity." *Id.* at ¶ 7. Dr. Sebban explains that typical encapsulation processes involve elevated temperatures (above 50°) and 2-3 hours of sonication, both of which "will most likely result in insulin degradation." *Id.* at ¶ 8. As all of the above amply demonstrate, the "process of preparing" the encapsulated product provides the key to the claimed invention, and allows the encapsulated product to exert its desired effect – improving health. Contrary to the Office Action's assertion, therefore, these process limitations are entitled to patentable weight.

The Examiner further rejects claims 106-107 and 116-120 as being unpatentable over U.S. Patent No. 6,482,517 to Anderson (hereinafter "Anderson") and U.S. Patent No. 6,048,562 to Mandralis et al. (hereinafter "Mandralis et al.").

The Office Action states that one of ordinary skill in the art at the time of the invention would have been motivated to mix the encapsulating and core component of Anderson by mixing the ingredient, as taught by Mandralis *et al.,* to avoid the denaturation and chemical cross-linking processes. The Office Action acknowledges, however, that neither of the cited references explicitly teaches adding the encapsulating material to a food, feed or drink. (Office Action at 6.) The Office Action states that Anderson teaches that encapsulating vegetable fats in cattle feeds is a conventional practice in the art at the time the invention was made, and that one of ordinary skill in the art would be motivated to have incorporated the encapsulated nutrients of Anderson et al. and Mandralis et al. to food, feed or drink to stabilize the material and increase shelf life. The Office Action concludes that in view of the above, the invention as a whole would have been obvious to one of ordinary skill in the art absent unexpected results to the contrary.

In the response to the previous Office Action, Applicant explained that the instant specification provides unexpected results that heat sensitive bioactive proteins, administered

orally, maintained their activity and exerted their desired effect (to cause weight gain and further improvements in health of a mammal) (see *supra*). In response, the Office Action maintains that these arguments are not commensurate with the scope of the claims of the instant specification. Yet as explained

As explained above, Claim 106 has therefore been amended to specifically claim insulin as the "sensitive bioactive ingredient". It is well recognized by those of ordinary skill in the art that insulin is highly sensitive to elevated temperatures. *See* Declaration at ¶ ¶ 7-8. As explained above, the claim recites administration of edible formulation, which requires "oral administration". To further emphasize this point, the term "orally" has been added to the claim. *See* Declaration at ¶ ¶ 4-9. Moreover, claim 106 has been further amended to recite that the improvement of health was seen "by at least one of increasing the rate of weight gain of said mammals, preventing diarrhea and other gastric disorders and increasing the life expectancy of said mammals after birth." Support to this amendment can be found in the instant specification paragraph [0082] and Examples 1 and 2 (paragraphs [0136]-[0143]).

It is thus Applicant's view that the claims as currently amended clearly present the unexpected findings of the present invention, and are thus allowable.

In view of the above, each of the presently pending claims is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejections and pass this application to issue. If there are any questions, the Examiner is invited to call Applicant's representative, Rodney Fuller, at (602) 916-5404 to resolve any remaining issues to expedite the allowance of this application.

Respectfully submitted,

July 19, 2010
Date

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